

General Use:

The components of the forecast engine are intended to be run within the same Jupyter notebook session and in order of appearance in the UI.

The base run involves running the “Create Forecast” feature to create the output tables and three component forecasts, the “Ensemble” feature to combine the three forecasts into one output forecast and the “Export” feature to create a txt file to allow the user to copy their previously run code into a BQA workbook for scheduling future forecasts.

Details of the last created forecast will be saved between sessions and will be used as a reference for future sessions until the “Create Forecast” feature is run again.

All non-checkbox inputs for a given section are required for that process to run properly unless otherwise noted.

Create Forecast:

Description: Create three distinct forecasts based off of the specified time series input data. The only input data table required has a format similar to the below table with a date, hierarchy (e.g. origin, destination) and a historic value to forecast off of (e.g. loads)

inputs

Schema

Details

Preview

Row	origin	destin	fscf_wk_end_dt	loads
1	622101CA002	6006	2018-04-08	15.0
2	874608OH001	5781	2018-05-06	0.0
3	11165NJ001FB	5982	2017-06-25	0.0
4	5621	5565	2014-08-17	29.0
5	5097	5920	2015-11-01	20.0
6	736100TX001	5852	2017-03-19	42.0

Considerations/Details:

Example forecast period setup: A forecast created with forecast periods value 13, forecast snapshot start and end dates of 1/1/2019 and 1/1/2020 and a weekly forecast frequency will create a snapshot each fiscal week from 1/1/2019 – 1/1/2020 with a forecast for each of the 13 weeks starting from the snapshot date.

Ensure that the last date in the input time series data is the day/week before the forecast snapshot end (currently the forecast output will stop generating forecast values for snapshot weeks after the input data ends)

The forecasts generated will use as much input data as available up to 6 years previous to the forecast snapshot week. It is generally best to use as much input data as possible up to this point.

Currently the best solution to reflect changes of business in the forecast (e.g. opening or closing of a new store) is to set up input data in a way that approximates the expected volume what is being forecasted. Another option is to use the later Forecast Adjustments section to quickly adjust to changes in the business as they happen.

External Forecast Input:

Description: Insert an existing forecast into the output table of the previous “Create Forecast” step. Additional input options below will allow this forecast to be used with later features alongside the forecasts generated by the tool.

Considerations/Details:

For best interaction with the later Ensemble and Forecast Analysis features, it is best if the uploaded forecast covers the entire time period in the previously created forecast table.

The inputs for the forecast value hierarchy, forecast created time period, forecast time period and forecast value inputs must exactly match the column names in the specified One Forecast Engine table and the forecast input query for this process to work.

Ensemble:

Description: Use either a rules based or reinforcement learning driven ensemble method to combine the previously created or inserted forecasts into a single forecast to use.

Considerations/Details:

The reinforcement learning method requires the associated rl.js file to be stored in a cloud storage bucket. If you do not have `analytics-supplychain-thd` access the default location will not be accessible and you will have to copy the file into a cloud storage bucket you have access to.

Both methods are measuring improvement based off of rolling MAPE values over the past n weeks.

The reinforcement learning method requires at least several years of generated forecasts to make an informed decision. With less history the rules based method will likely be more accurate.

Forecast Analysis:

Description: Plot accuracy of generated forecasts in terms of MAPE or forecast vs actual values.

Considerations/Details:

MAPE is volume weighted, calculated at the lowest specified level and then averaged across all forecasted levels each week.

Forecast Adjustments:

Description: Select additional adjustments to make to a previously created forecast based on results of analysis. Adjustments made will stack on top of each other.

Considerations/Details:

Currently adjustments will happen in place in the most recently created forecast output table. Make a copy of the table beforehand if you would like to retain the original forecast output.

Explanation of adjustment methods:

Reactive adjustments – Adjust for consistent trends over the last 3 time periods. If forecast values were all above or all below actuals for the last three weeks, future forecast values will be adjusted by the average gap until the trend ends.

Forecast Increase - Increase all forecast values by the input percentage

Forecast Decrease - Decrease all forecast values by the input percentage

Export Forecast:

Description: Export code to a txt file in the current working directory to allow the user to copy the code into a BQA workbook to schedule future forecasting updates.

Considerations/Details:

The export will only include forecasting processes run in the current session. The entire process must be run in the same session to properly export it to BQA.

The exported process will assume that the final output table is the one identified with the Final Output Table input in the Create Forecast section.

The export is set up to update the forecast for the current day/week only so the workbook should be set up to be run every day/week according to the forecast frequency.

The original input data table used to generate the forecast must be updated regularly for the exported forecast to properly update.